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BIOGEOGRAPHY AND HABITATS OF *PONERA EXOTICA* (HYMENOPTERA: FORMICIDAE)

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ABSTRACT

Ponera exotica is interpreted as a native North America ant rather than an introduced exotic, based on new and earlier distributional and ecological data. Collections reveal a marked patchy distribution and a likely subterranean existence.

Key Words: *Ponera exotica,* biogeography, habitats.

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INTRODUCTION

This paper gives new distributional data for *Ponera exotica* Smith, suggests the species is a native North American ant rather than an introduced exotic, and comments on its dispersion within a habitat. The genus *Ponera* was revised on a world wide basis by Taylor (1967) where he recognized 28 living species and one extinct form. The living forms compose two basic divisions. The *coarctata* group consists of two living species where one form, *pennsylvanica,* occurs in eastern North America and *coarctata* lives in Europe with a few records in north Africa and the Middle East. The single fossil taxa was from the Baltic Amber. Twenty-five living species form the larger Indo-Australian group where New Guinea is the center of distribution. The remaining living species is *P. exotica,* a small ponerine ant that first came to the attention of the myrmecologist, Marion R. Smith, from specimens collected in 1959 by D. L. Wray in North Carolina. The following year, W. G. Carter sent Smith specimens from six counties taken in a survey of the North Carolina ant fauna (Carter 1962). Smith (1962) described the species and, based on morphological similarities to Indo-Australian ants, concluded it was introduced from that region by ". . . Armed Services during World War II or shortly thereafter." Subsequently, Carter collected ants in Oklahoma and again found the species in widely separated sites. These specimens were reported in the revision by Taylor (1967). Taylor still accepted Smith's interpretation that the North American material was exotic. Twenty years have now elapsed with no further mention of the species in the literature.

DATA AND INTERPRETATIONS

Over the last few years, I have collected ants over much of north Florida, specifically concentrating on the fauna of leaf litter, rotten logs, etc. These efforts have yielded *P. exotica* from five Florida counties. These counties are Wakulla, bordering the Gulf Coast; Columbia and Putnam, inland in the northern peninsula;

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St. Johns and Flagler, bordering the Atlantic Coast. All Florida collection sites involved native plant communities far removed from human development likely to introduce exotics. The Wakulla site (one collection, six specimens) is a mature mesic hammock characterized by both deciduous and evergreen hardwoods near Wakulla Springs. Two sites exist in Columbia County. One habitat (five collections, 40 specimens) is a mature mesic forest dominated by mixed deciduous hardwoods bordering the Santa Fe River foodplain west of Fort White. The other site (one collection, 10 specimens) is a mature mesic hammock dominated by broadleaf evergreen hardwoods in the Ichetucknee Springs State Park. The Putnam site (two collections, five specimens) is an ecotone between a mesic broadleaf hammock and a sand pine scrub bordering the Oklawaha River floodplain in the northern part of the Ocala National Forest. The St. Johns and Flagler sites are ecologically similar and characterized by xeric evergreen scrub growing on the white sands of old dunes near the sea coast. The former site (one collection, 14 specimens) is within Favor Dykes State Park and the latter site (two collections, eight specimens) occurs in Washington Oaks State Park. Mark Deyrup (personal communication) recently found a series of *P. exotica* in a Highlands County, south Florida, collection taken by W. S. Suter in 1965 (two collections, 22 specimens) in a magnolia-cabbage palm forest.

Carter's North Carolina records included Orange and Union Counties in the Piedmont having open, xeric stands of post and blackjack oaks where leaf litter was thin and discontinuous. Craven, Duplin, New Hanover, and Beaufort Counties were Coastal Plain sites and included beech-pine-hardwood and loblolly pine forests together with mixed hardwoods bordering swamps. Smith (1962) listed 18 other ant species taken with 177 *P. exotica* specimens in North Carolina and all species are considered native ants. All ants associated with the north Florida collections of *P. exotica* were also native. The 29 associated species in the Highlands County collection did include 10 species which are probably exotics. The Oklahoma records, ". . . about 100 specimens" (Taylor 1967), included material from Payne and McCurtain Counties representing the north-central and south-eastern parts of the state respectively. Payne County collections were from tall and short grass prairies associated with xeric scrub oaks while the McCurtain County material came from mesic floodplain forest. No reason exists to believe these sites are likely for exotics. The associated ant species were not given.

Introduced or exotic ants usually occur in disturbed habitats, near sea coasts or appear in only localized areas and often establish colonies in several places throughout the world. *Ponera exotica* has never been found in the Indo-Australian region or elsewhere than the above-mentioned sites in the eastern United States and these habitats have not been greatly modified by human activities. The south Florida site in 1965 was probably the most disturbed site mentioned but was still characterized by native plants. The extent that Carter collected about disturbed sites or sea coasts is unknown. I have often sampled such sites in Florida without finding *P. exotica.* An example of an exotic ant found in such sites is *Strumigenys silvestrii* (Johnson 1986). An invading species with the ability to colonize both xeric and mesic native habitats from Oklahoma, North Carolina, and much of Florida could be expected to occur also in disturbed habitats and to have been recorded somewhere near its original range, but no such records exist. Also, if the species colonized North America as recently as World War II, the likelihood of its having successfully colonized the array of natural communities noted above without

appearing in disturbed sites is unlikely. From these observations, I suggest that *P. exotica* is a member of our native ant fauna. The fact that it shares morphological attributes with Indo-Australian ants need not invalidate this possibility. In fact, the relations suggested by Smith and Taylor may well exist and the species is a survivor from a very old insect fauna.

Wray's, Carter's, and Suter's specimens were all collected by Berlese funnels and all of my specimens were likewise from soil-litter extractions using a different process (Johnson 1984). The body length is approximately 2 mm, slightly larger for queens. Most ant collectors appear to have not routinely used soil extraction techniques. The extraction used by the author yields live specimens if the extract is checked 2 to 3 times daily. From these ants, I have observed their movements to be quite slow and deliberate. A collector seeking *P. exotica* directly in the leaf litter would require exceptionally sharp vision. Another small native ponerine ant was also long overlooked. Sometime prior to 1863, a collector obtained a specimen somewhere in "Nord Amerika" (probably South Carolina) using an unknown collecting technique. Based on this collection, *Discothyrea testacea* Roger was described by Julis Roger in 1863 and no collector found it again for 85 years. Creighton's 1950 volume on the Ants of North America makes no reference to the species. Only in 1948 did a collector, using Berlese funnels, rediscover the species and Smith (1954) redescribed it. Subsequently, collectors using soil extraction methods have taken specimens from a number of localities in four southeastern states. I suggest that *P. exotica* is not uncommon but requires a collecting procedure often by-passed by many myrmecologists. With more detailed faunal studies, a wide distribution in the southeastern U. S. will probably unfold.

Another feature of the species' ecology may contribute to its rarity in collections. Judging from the author's experience with litter extractions, a very patchy distribution exists within acceptable habitats. Where *P. exotica* has been found, all specimens were taken from an area of about two square feet (0.18 sq. M.). I often take 3 to 4 bags of litter along the margin of a single rotting log. The samples are typically no more than 3 to 4 feet (0.9 to 1.2 M.) apart. If *P. exotica* is found, all specimens are taken from only one bag. On two occasions, I returned four days later and resampled in the same sites. Again, I obtained *P. exotica* in the same localized area, though the litter had been disturbed by the first collection, and failed to find it in the nearby sites. I was unable to note any meaningful differences between such sites. Among the author's 12 different collections, only one consisted of a single specimen and all collections having as many as seven or more specimens included a queen. The observations suggest the species does not forage widely from its nest site. Further, no litter sample yielded specimens that did not also include some underlying soil suggesting it may be largely subterranean in its activity. Specimens have been taken in March, April, May, July, August, and November but no alates have been seen.

SUMMARY

On the basis of collections of the ponerine ant, *Ponera exotica,* in North Carolina, Oklahoma, and Florida the species is now considered a native North American ant and possibly a survivor from a very old insect fauna.

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